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SYSTEMS MANAGEMENT AND OPERATIONS IN THE PLANNING PROCESS

REVIEW OF THE SAN DIEGO, CALIFORNIA METROPOLITAN AREA

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FOREWORD

This paper was prepared by the U.S. Department of Transportation's (U.S. DOT) John A. Volpe National Transportation Systems Center (Volpe Center) for the Federal Highway Administration's (FHWA) Office of Metropolitan Planning and Programs. Mr. David W. Jackson of the Volpe Center's Economic Analysis Division is the principal author. Mr. David Rutyna, EG&G Services, and Mr. Allan J. DeBlasio, the project leader, provided additional support. Mr. Brian Gardner and Mr. Douglas Laird of the Office of Metropolitan Planning and Programs provided the direction for this project. Mr. DeBlasio should be contacted concerning comments on this report at (617) 494-2032.

Systems Management and Operations in the Planning Process

San Diego Metropolitan Area Summary

Introduction

The John A. Volpe National Transportation Systems Center (Volpe Center) is assisting the Federal Highway Administration's (FHWA) Office of Metropolitan Planning and Programs in assessing the level that management and operations (M&O) aspects of projects and programs are currently involved in the metropolitan transportation planning process. While the Intermodal Transportation Efficiency Act of 1991 (ISTEA) regulations identified M&O as one of nearly two dozen planning factors, the Transportation Equity Act for the 21st Century (TEA-21) places much more importance on M&O benefits and costs in the formulation of plans and programs. The goal of the legislation is improved regional decision making, resulting in the coordinated delivery of products and services that provide safer, more reliable travel.

The FHWA recognizes that there is no single blueprint for managing and operating complex transportation systems throughout the vast variety of U.S. metropolitan areas. Efforts must be tailored to meet the unique needs of each region. In turn, the region's goals and objectives for operating the system should stem from the consensus of a strong planning process. It is expected that the FHWA will work through the metropolitan planning organizations (MPOs) to lead the delivery of this TEA-21 provision and, once established, to follow its progress.

The Volpe Center team has already studied four metropolitan areas – Columbus, Ohio; Des Moines, Iowa; Portland, Oregon; San Diego, California – to ascertain how these areas are considering M&O within their project development and planning processes. All four of these areas were selected because they are notable as having a very strong regional focus, are deploying a significant level of intelligent transportation systems (ITS), transportation demand management, and transportation systems management projects that are very operations-intensive projects, and their transportation planning process are seen as progressive. This paper summarizes the findings from discussions with transportation professionals from the San Diego Metropolitan Area.

Planning Documents

Although not explicitly referenced in many planning documents, M&O are included in various ways within the work and projects cited in the regional planning documents. Available planning documents were reviewed to assess if any analysis of post-deployment M&O were conducted, how M&O issues were being documented, and if there was any indication how much experience and understanding the MPO staffs had with M&O functions. This section describes the findings from the review of the planning documents.

Transportation Improvement Program (TIP) Fiscal Year 1998-2004 - The TIP is principally a listing of projects with minimal review of any M&O aspects and no project comparisons that include M&O impacts. The TIP lists projects that receive federal funding and other major projects and programs. The project listings include the location and description of the proposed work, the project cost, anticipated funding sources, and the schedule year of the work. Some projects that are in an operational phase are listed, including several Metropolitan Transit Development Board (MTDB) rail projects and the San Diego Association of Governments' (SANDAG) Freeway Service Patrol. Financial capacity assessments, which are based on planning and programming documents submitted by the local transportation providers, are included for major program areas, but are not project specific. Costs listed in the financial capacity analysis include engineering, right of way acquisition, operations, and vehicles and equipment. The components of the operations costs were not identified. TIP criteria have recently begun to include efficiencies of modal facilities. Improved performance objectives, such as delays and emissions, are enabling better comparisons of transportation facilities.

Regional Transportation Plan (RTP) Fiscal Year 2000 – The "Region 2020" RTP, adopted in November 1999, is an integrated 20-year plan that covers all modes of transportation used in San Diego County. The current plan focuses on highway and transit, but also addresses air, water, bicycle, and pedestrian travel. While the previous RTP was primarily a compilation of projects from each agency, the current RTP is more consistent with a regional vision. Management systems that cross jurisdictional boundaries are now being included in the document. The sections of the RTP are put together by MPO sub-committees, including the ITS Sub-Committee, which is responsible for the transportation systems management and advanced technologies chapter. When the ITS Sub-Committee makes a consensus decision that certain components of a system are regional (as compared to jurisdictional components), they are making an agreement that the M&O costs for those components will be funded regionally. Individual agency M&O costs are not detailed in the document.

The Region 2020 Plan included policies that support the use of performance measures to evaluate current and future multimodal systems for the movement of people and goods. As a minimum, the performance measures should include highway performance (e.g., level of service-LOS), the frequency and routing of public transit, and the coordination of public transit services. Performance measures were rarely identified, but the development of these measures was explicitly stated as action items, especially under the congestion management program. The RTP also noted that the performance measures were to be linked to the purposes and objectives of system operations.

The finance section states that capital, operating, and maintenance costs for the region's transportation system for the next 22 years are compared against estimated revenues. Costs for individual projects were not listed but project category costs and revenues were provided. Highway and transit capital and operating revenues were highlighted in the RTP. Challenges to meet the projected shortfalls were discussed. The financial element contains policies and actions that can be initiated to provide the necessary additional funding to build, operate, and maintain the region's surface transportation system. There was no actual analysis that showed how each agency determined their operating needs and if this had any bearing on the policy decisions.

Discussion of M&O by Agency

Representatives from the MPO, the state DOT, the regional transit agency, and the principal local government were contacted for this study on M&O. Each agency has varied perspectives on what functions are included within M&O, the proper role of the MPO in M&O analysis and activities, and if the Federal Government should require M&O analysis in the planning process. This section discusses these and other thoughts regarding M&O activities that are specific to each public agency represented in this review.

MPO– San Diego Association of Governments

The SANDAG jurisdiction comprises 19 cities and the County of San Diego, and mirrors the geographic boundaries of San Diego County. While SANDAG does not consider itself to be an operating agency, it jointly operates and manages the Freeway Service Patrol program with Caltrans and the Highway Patrol) and the Coronado Bridge toll collection program with Caltrans programs. SANDAG is fully responsible for the M&O of the Rideshare and Fastrak programs. (The Fastrak program allows drivers of single occupancy vehicles to pay tolls to use highway carpool lanes). The MPO official interviewed stated, however, that the MPO's foremost responsibilities are to support its member agencies by addressing their needs, which include the agencies' need to gain management capacity, achieve system–wide goals, and locate additional M&O funding. Sometimes, supporting agencies' need to gain management capacity entails assisting in M&O analyses at individual agencies. The MPO is heavily involved with planning for regional management systems that provide improved transportation management capabilities for its agencies, both individually and collectively.

The MPO's directive has been to focus on the performance of the overall transportation system of the San Diego area, while considering the cost of each project or program. SANDAG's policy is to channel funding toward projects and programs that enhance the performance of this system. It is the MPO staff's role to examine costs and determine how best to allocate funding. SANDAG administration believes that performance improvements can most efficiently be realized through optimal operation and management of the transportation system.

The SANDAG official expressed that ITS, the Congestion Mitigation and Air Quality Improvement Program (CMAQ), and the TEA-21 have all generated momentum for regional M&O consideration in recent years. ITS strategies are usually regional. Incident management systems, transit management, and traveler information are management systems that are not specific to one jurisdiction, and impact the whole region. Few benefits of these systems are realized without consideration and funding for M&O. There is now more acceptance of ITS and of operations, in general. TEA-21 money was not dedicated to the level of ISTEA funds, thereby providing more flexibility to spend funds on ITS and operations. This flexibility in the language of TEA-21 has resulted in more willingness by policymakers to manage the existing system to increase capacity, rather than just build capacity. CMAQ has also increased the support for and level spent on operations projects. It is easier to fund operations-based projects with this type of funding than to fund new construction projects or other capacity-increasing projects.

While these factors have contributed to the recognition of M&O concerns, the MPO respondent asserted that mainstreaming the inclusion of performance measures in the planning documents is

the best method of encouraging M&O consideration, as the achievement of performance measures necessitates M&O consideration and review. The MPO staff has been the leading proponent of expanding the use of performance measures in the TIP and RTP and believes that there should be some requirement that the goals of the RTP are met. Currently, there are no verifications built into the planning process to ensure that the area's transportation goals are met or that there is progress towards these goals. Performance measures would be used to target those goals.

State DOT –California Department of Transportation (Caltrans) District 11

Caltrans District 11 includes San Diego County (the entire SANDAG planning area) and Imperial County, which lies to the east of San Diego County and stretches to the Arizona border. The Caltrans interviewee reported that the agency considers M&O to be "operations and maintenance" rather than "management and operations" and reflects that in its organizational structure and in its budget. The Operations Division is responsible for monitoring all state highways, and the operation of the ramp metering system, intersection traffic signal system, transportation management center (including surveillance and incident response), and the safety-monitoring program (in conjunction with the highway patrol). The Maintenance Division, which is funded through the state highway account, is responsible for the upkeep of roadways, guardrails, and signage. Despite the implementation of ISTEA and TEA-21, the interviewee conveyed that there has been very little change in the way the agency operates.

The Caltrans representative expressed that the MPO should only be involved in management functions for regionally integrated systems. Caltrans sees the MPO's role as facilitating the coordination necessary to operate the area's transportation system, adding that the MPO is primarily the "roof under which all of the agencies in the region meet." The Caltrans official emphasized that this is a critical role, as the operations of systems will increasingly involve coordination between Caltrans, the local agencies, and other regional partners. All agencies work within the umbrella of the MPO through the ITS Sub-Committee, the technical San Diego Traffic Engineers' Council (SANTECH), and other committees to do the necessary coordination. This respondent concluded that while it should be a regional decision to include M&O costs in the metropolitan planning process, there should be a mandate that regions become more involved in the support of systems that require regional integration and coordination.

Transit –Metropolitan Transit Development Board

The MTDB oversees a wide range of services in southern San Diego County including light rail, bus, taxi, and paratransit services, and the San Diego-Imperial Valley Railroad (freight). All services are contracted out under the Metropolitan Transit System and are overseen by a relatively small staff of 80 at MTDB headquarters.

There is no agency-approved definition of M&O nor is there a defined process to take M&O into account, although staff are aware of M&O considerations due to the nature of the agency. The MTDB official interviewed offered that the agency makes efforts to reduce operations and maintenance needs via proper and efficient design and products. M&O issues are usually considered after capital projects are funded and the procurement process begins. The MTDB interviewee asserted that the agency's mission is to expand modes and service routes. Thus,

spending has been directed at service expansion over M&O service improvements on existing routes.

The MTDB administration does not believe that the MPO should be used or is suited to perform M&O analysis of transit. The transit representative expressed that the MTDB staff has the knowledge to understand and establish its own operational needs and is capable of performing its own M&O analysis. The transit staff does not presently conduct any formal M&O analysis. A more detailed and formalized M&O consideration by the transit provider can be done without any requirement, but would require additional staff so that the service expansion objectives would not be compromised. The transit official did, however, see the value of a requirement if it was tied to additional funding to support M&O activities.

Municipality – City of San Diego, Transportation and Drainage Design Division

The City of San Diego divides the road system staff responsibilities between traffic operations and street maintenance. Signing and striping, and traffic engineering are part of traffic operations. Street maintenance activities include paving work, replacing signal heads, and fixing loop detectors. Maintenance related to fiber optics has been added to the responsibilities of the street maintenance division, as there has been a proliferation of fiber optic type street cuts in the past five years.

A City official reported that there is no working definition for M&O at the agency and that the term "M&O" is seldom used. The interviewee added that most of the agency staff is only now getting used to the term "ITS."

The City official interviewed sees SANDAG's M&O role as providing a forum to talk about issues through committees and to provide funding. Communication about M&O between the City of San Diego and the MPO is achieved through the SANTECH and the ITS Sub-Committee. There are additional sub-committees for many ITS projects. The MPO has proven invaluable for providing forums for the discussion of striping, signing, and signal timing. The interviewee does not, however, see the need for the MPO to become involved the M&O of those activities. The official added that most M&O issues are local and should be addressed by local agencies. Echoing the Caltrans representative, the San Diego respondent did see a benefit, however, to the inclusion of multi-jurisdictional projects, such as signal integration work, into the metropolitan planning process. This would include an analysis of M&O for each large, multi-jurisdictional project.

The San Diego representative maintained that a problem might arise if municipalities become eligible for state and federal funding for routine M&O activities. Although many agencies may use this funding for its intended use, others would become dependent on these funds for their base level of service. Eventually, the diversion of traditional capital funds to fund basic M&O services will create a shortfall in capital funds and a backlog in capital projects. Thus, restrictions on M&O funding may be more beneficial than funding that allows for flexibility in its use.

General Findings from Metropolitan Area Interviewees

A majority of the respondents from the metropolitan area were in agreement on a number of items related to M&O. Findings that apply broadly to M&O issues are summarized in this section. Much of the key information yielded by the interviews relates specifically to data, committees, federal requirements, and successful actions and are included in subparts to this section. The first part addresses what data are being collected, how they are shared and used, and what additional data planners and operators need to better analyze M&O. The next part highlights area committees, most often led by the SANDAG or the Caltrans, which have addressed M&O concerns at meetings. Opinions of area transportation professionals regarding the possible creation of a federal requirement to analyze M&O are then discussed. Lastly, there are several successful actions that appear to have worked well to increase M&O consideration in the metropolitan area and could serve as models for other metropolitan areas to follow.

- San Diego is a fairly cooperative metropolitan area, which makes it relatively easy to coordinate projects that involve multiple agencies and jurisdictions.

The cooperative culture exemplified by SANDAG and Caltrans has fostered an increase in the number and size of multi-jurisdictional and regional projects. Local agency officials are just now realizing that resolving regional needs generally serves everyone in the metropolitan area. The recent regional push to channel funds towards the support of M&O concepts along important corridors is indicative of this realization.

- There is a recognized need to examine M&O. Barriers exist, however, that impede consistent and thorough M&O examination.

While the area representatives are open to reviewing M&O issues, they also recognize that they cannot put more funds into M&O functions and still meet capital infrastructure needs. In fact, area officials reported that there is an $18 billion funding shortfall in meeting infrastructure needs, including a $9 billion shortfall from the 1996 RTP.

In addition, although inter-agency coordination in the metropolitan area has increased, the lack of intra-agency coordination remains a barrier to M&O examination. More coordination is needed between groups that create plans and those that operate finished projects. Improved intra-agency coordination would enhance the RTP and other planning documents. To date, there has not been much follow through to make the RTP become a reality and verify that goals were met.

Data

Transportation data is already generated at great levels by the agencies in the San Diego Metropolitan Area. Greater problems seem to exist with regard to data sharing and agencies having the available resources to analyze data and make the data more useful to operators and planners. This section will highlight data issues affecting the MPO, the state DOT, the transit agency, the principal municipality, or issues impacting all the agencies in the metropolitan area.

San Diego Association of Governments

- SANDAG performs data management for its member agencies.

SANDAG staff is charged with the responsibility of data management for the San Diego region. A significant amount of land use, demographic, economic, and transportation data are currently collected, compiled, analyzed, and disseminated to the member agencies. The interviewee did express a need, however, for more data that can be utilized by both planners and operators to understand, plan for, and improve M&O of the area's transportation system.

- Data are needed that can determine whether performance objectives are being met.

The MPO respondent maintained that the achievement of the M&O goals from a project or system could be verified by data. The respondent believes that the increased use of performance measures, especially as performance measures are used on more multijurisdictional projects and on regional systems, will promote data sharing in the metropolitan area. Thorough performance assessments will require some level of operations data that can only be available through data sharing.

Caltrans

- M&O funding difficulties have prevented the traffic management center (TMC) from receiving data from many loop detectors that have been installed.

The Caltrans TMC system generates data from inductive loop detectors, which are used continually by the TMC staff to detect incidents, adjust the ramp-metering system and are disseminated to traveler information systems, including the Caltrans website. Although this system is operational, it is generating only a fraction of the data it could be capable of generating because of an agency M&O funding issue. The TMC has not been able to receive data from hundreds of additional loop detectors that have been installed. Despite an installation expense of several hundred thousand dollars, Caltrans has not increased its operations budget to pay for the communications costs. The only loop detectors they are currently receiving data from are those associated with the ramp metering system.

- The State's budgeting process is a barrier to data collection and sharing.

The state finance department's and legislature's budgeting processes classify conventional phone line communications with field equipment as basic overhead operating expenses, similar to office communication expenses, and are thus less likely to appropriate large increases to the operating budget. Budget increases for maintenance costs, such as guardrail repair and re-striping, however, have historically been approved with comparatively little difficulty. By putting the operations costs in a vehicle that the legislature views as maintenance costs, as compared to bureaucratic overhead costs, Caltrans is now receiving the funding increases necessary to communicate with its field devices. Largely because the legislature classifies fiber-optic system related costs as maintenance rather than operations, and is thus more willing to appropriate funding for it, a multi-million dollar fiber-optics communications system is being developed and deployed, which will provide for communication with field equipment. The

fiber-optic cable projects are being prioritized towards areas where the loops have been already been cut.

- When completed, the fiber-optic system will increase data sharing among regional agencies.

The fiber-optic system will ultimately facilitate communications and data sharing between the regional agencies. The system will not only allow Caltrans to be able to communicate with its field systems, but will link regional agencies into a common network. By making a short connection to the network, the MTDB, for example, will be able to use the Caltrans system to communicate with its cameras at remote stations without having its own fiber-optics system.

- Planners are being consulted in the design phase of the area's system network integration project so that planning data needs are better met.

The Caltrans representative reported that TMC system data is currently being used primarily for operations and has not met the needs of planners. Previously, operations personnel were consulted in the design of the TMC system, but planners were not. The interviewee conceded that the report functions useful to planners in the current system are not very good. The representative added, however, that this error has been recognized and planners from the City of San Diego, Caltrans, and SANDAG are being consulted in the design of the current region-wide systems integration project. The systems integrator is asking planners about their data needs, formatting and archiving requirements, and how they want the data presented.

Metropolitan Transit Development Board

- The MTDB would like to collect more of the same types of data, but is concerned about staffing issues related to data analysis.

SANDAG collects transit passenger boarding and ridership counts and share this information with the MTDB. The MTDB also collects other standard transit operations data such as travel time and vehicle performance (diagnostic) information. Transit management system equipment, which would provide operational data to help operations staff perform more efficiently, is not in the buses or rail vehicles at this time. The agency is examining using technologies to assist with data collection, including automated passenger counters. The MTDB representative expressed that the agency doesn't need additional types of data, but would like to receive more data points. The respondent added that if the agency were to collect more data, they would need additional staff to perform the data analysis responsibilities and there is presently no funding available to hire additional staff.

The City of San Diego

- The City of San Diego is just beginning to generate and recover usable operations data.

The City of San Diego representative reported that the agency has not been very effective at recovering data and that until recently, most data had been stored in paper files. Staff from the

City's Engineering and Capital Projects Department are now taking serious steps to generate recoverable data. Among the actions now being taken, Department officials are working with a GIS database firm to access useable operational data from its field equipment.

- The City of San Diego Maintenance Division may soon have access to data that will allow the agency to better plan and schedule its work.

The division is working on a project called "synergy" with a GIS database firm. This project is modernizing the agency's maintenance data collection and reporting and will allow the agency to capture its location reference information, along with work that was scheduled, and work that actually did get done. The improved record keeping on the issues and problems will allow the agency to begin to analyze and aggregate their data in a better way to improve project planning and scheduling of field crews' work.

- Improved and consistent traffic count data and accident data would be beneficial to planners.

The City of San Diego interviewee mentioned that traffic counts traditionally get cut in budget crunches. The interviewee added that traffic counts and accident data are critical to transportation planners' needs and are the fundamental basis of any transportation-related project. It was also noted that the City of San Diego does not receive accident data from the police department unless a fatality is involved. The unavailability of accident data impedes efforts of planners to plan improvements to problem intersections and locations.

Committees

Committees created through the MPO process and as part of the Southern California Priority Corridor Program have provided forums for M&O related issues to be addressed, although no committees exist specifically to examine M&O issues or impacts. This section will examine which committees have been responsible for increasing M&O discussions in the San Diego Metropolitan Area.

- Regional committees have been responsible for increasing M&O discussions.

Area respondents noted that M&O functions are now discussed at numerous regional committees, although no committees have been established specifically to address M&O concerns.

- The Early Deployment Planning Study (EDP) process provided the genesis for the increase in the level and depth of M&O discussions in recent years.

The SANDAG representative remarked that working groups established by SANDAG through the EDP process have fostered regional coordination and increased consideration of ITS. The resulting momentum generated by the ITS initiatives is necessary for regional consideration of M&O. Committee efforts towards developing performance measures, setting goals and objectives for system improvements, and the management of systems have increased the level

and depth of M&O discussions among staff from the area's transportation agencies in the past two to three years.

- The priority corridor program structure has been a catalyst for ITS development in the region.

Through the priority corridor program, which involves both the SANDAG and Southern California Area Governments regions, an ITS strategic plan was created which discusses the inter-regional issues in Southern California. The priority corridor program provided funding for four regional ITS plans, which are all supposed to coordinate with the priority corridor ITS strategic plan. Under the priority corridor funding, SANDAG led the effort to develop an ITS plan for San Diego County and formed the ITS Sub-Committee, which reports to the Transportation Committee of SANDAG. Decisions regarding ITS deployments in the region and some of the M&O issues pertinent to the deployments are made through the SANDAG ITS Sub-Committee.

- SANTECH, originally established outside the MPO structure, has been an important forum for the discussion of M&O.

Prior to the creation of an ITS Sub-Committee, traffic engineers who felt a need for public agencies to work on common issues and share information started SANTECH, initially as a sub-committee of the region's Institute of Transportation Engineers chapter. SANDAG officials, having the responsibility to distribute CMAQ allocations, asked SANTECH to be an MPO sub-committee, as an entity was needed that would prioritize and consider projects within the traffic signal arena. The official from the City of San Diego reported that M&O type issues are discussed through SANTECH. Traffic engineers from small agencies, in particular, benefit from SANTECH, as they are able to leverage information that they would not have had the resources to obtain on their own.

- Other committees and agencies within the SANDAG organizational structure have some involvement in M&O activities.

Within the SANDAG organizational structure, there are a number of agencies that have some involvement with M&O activities. Additional committees that review and discuss M&O activities include the freeway management, incident management, traffic information, commercial vehicle, and the transit management sub-committees. The transit management subgroup comprises 19 transit agencies. This subgroup has improved overall transit operations by allowing the agencies to act as common carriers to improve and facilitate travel by patrons between the different transit systems.

Federal Requirements

The transportation professionals interviewed from this metropolitan area were asked their opinions regarding the value of federal requirements to make M&O consideration part of the metropolitan planning process. As part of this inquiry, these interviewees discussed the type of review, if any, that should be required. The agency representatives also commented on any

M&O issues that may result from related provisional changes, such as the impacts from the National ITS Architecture, standards development, and other major planning and environmental changes.

- The San Diego Metropolitan Area transportation professionals surveyed differed in their viewpoints of federal requirements to include M&O considerations in the metropolitan planning process.

All interviewees saw the value of some level of M&O consideration within project and program development. They disagreed, however, concerning who would perform any analysis and who would provide the necessary resources for M&O examination. There was consensus that federal policies should be enabling, rather than mandating.

- Transit sees M&O analysis as a means to generate additional funding.

While the MTDB is reluctant to involve the MPO in its M&O activities, it does see a benefit to M&O inclusion in the planning process as a means to generate additional funding. The MTDB does not consider M&O to be a priority, yet admits it would be more likely to consider M&O impacts and to perform more formal M&O analysis if it meant that funding for these activities were available.

- M&O issues should be reviewed for multi-jurisdictional projects.

Officials from Caltrans District 11 and the City of San Diego agree that it makes sense for the M&O of programs and projects that cross jurisdictional borders to be included in the area's planning documents. The Caltrans interviewee felt that there was not enough discussion of M&O included in the draft for the new RTP, especially with regard to the highway and the advanced transportation systems elements. The respondent added that area agencies are somewhat reluctant to deploy advanced systems due to concerns over long-range operations and maintenance costs. A requirement that the M&O of multi-jurisdictional projects and regional programs be included in metropolitan planning documents would force the area's agencies to confront M&O issues early and would potentially facilitate how deployment of these systems will ultimately benefit the region.

- A requirement that RTP goals be met would increase M&O consideration and a requirement for M&O consideration would increase the attainment of M&O goals.

The SANDAG representative believes that a requirement for the inclusion of M&O consideration into the metropolitan planning process is necessary to assure that the proper level of M&O activity is occurring. MPOs are responsible for developing and executing the transportation plans of metropolitan areas, yet they are powerless to carry out the plans unless member agencies are held accountable for effectively operating and managing elements of the transportation system to the point where the goals of the plans are being met. Presently, there is no check that the goals are being met. A requirement that local agencies must meet the RTP goals would encourage agencies to consider and analyze M&O functions in order to achieve the goals of the plans.

- Area representatives' opinions differ concerning the appropriateness of MPOs examining the M&O activities of individual agencies.

Two interviewees from San Diego metropolitan area operating agencies concurred that the majority of the country's MPOs most likely lack the staff resources to analyze the M&O of individual agencies. Conversely, the SANDAG representative asserted that the staff at the San Diego MPO already have the skills and database resources to examine M&O impacts. They would have to work with operating agency staff to develop indicators of level of performance. One operating agency representative also added that it would be outside the MPO's realm of responsibility to consider what has traditionally been the province of each agency.

Successful Actions

This section examines what positive actions have occurred by public agencies within the metropolitan area to increase or introduce the examination of M&O issues. These successful actions by a single agency or the region as a whole demonstrate steps that accelerate movement toward the consideration of M&O issues.

1. Statement of value and development of performance measures in planning documents

Performance measures are now being developed for the TIP and RTP. The MPO staff and operating agencies are working to expand and improve these performance measures. SANDAG is writing methods to optimize capacity into the RTP. The methodology will show the realistic and optimal performance levels of each roadway.

Performance measures in the planning documents are primarily related to overall system performance, including an ITS goal of 10% improvement of the performance of the regional transportation system. The RTP also includes performance goals set for highway performance, such as requiring that all areas with LOS "F' be mitigated to LOS "E", cutting freeway congestion by 50%, and increasing the freeway capacity target from 1600 vehicle-miles of travel (VMT) to 2000 VMT. The frequency and routing of public transit are also addressed with performance measures. Transit performance standards within the Congestion Management Plan call for transit route frequencies varying from 15 to 90 minutes between buses. Thus far, performance measures have not been used extensively on individual projects or programs.

The SANDAG representative reasoned that much of the increase of M&O discussions in committees in the last couple of years are due to the existence of performance measures in the planning documents. The use of performance measures to target objectives stated in the planning documents increases the likelihood that the area's transportation plans become a reality.

2. Pre-distribution funding of regional projects by the MPO

Funds to connect the communications network, for regional ITS systems, and other regional projects are taken "off-the-top", before funds are allocated to local agencies. While the metropolitan area's transportation needs are both regional and local, allocations directed towards

regional needs not only serve the region, but the local jurisdictions within the region, as well. The local jurisdictions have been empowered by the delivery of ITS and other applications to them, through funding directed towards regional system management needs. The SANDAG interviewee espoused that the path towards regional allocations requires the recognition of mutual goals among local jurisdictions. This process promotes regional cooperation and inter-jurisdictional systems integration, which are inherent benefits of ITS. The pre-local allocation method facilitates the MPO's examination of impacts, including M&O impacts, from regional projects and increases the likelihood of multi-jurisdictional project approval.

3. Fiber optics cable system agreement

A memorandum of understanding has been developed and signed by three City of San Diego Departments regarding the fiber optic system. This agreement concerns the conditions of sharing the existing and future fiber optic conduit and cable between the City of San Diego's Metropolitan Wastewater, Engineering and Capital Projects, and Transportation Departments. The M&O responsibilities for each department regarding inspection, cleaning, and repair of the shared communication system are detailed.

U.S. DOT Actions

While much of the discussion with the transportation professionals centered on what they have done and what they may do, the interviewees were also asked what actions officials with the U.S. Department of Transportation could take to assist metropolitan areas with their consideration of M&O. The actions could range from meeting training needs, to providing funding, to providing legislation that is both practical and easy to understand. This section reviews those actions requested by the representatives of the transportation agencies from this metropolitan area.

1. Training related to ITS should include the M&O aspects of ITS.

While the Federal Government has provided much ITS-related training, the M&O aspects of ITS have not been focal training topics. Training could be provided as to how to obtain funding for M&O, including how best to justify M&O costs.

2. Assist local agencies in the development of performance indicators.

Many MPOs, DOTs, and other agencies may not have the resources, tools, staff, or knowledge to develop and to execute performance indicators. Without performance indictors in place to use as justification for resource expenditures, agencies will most likely continue to have difficulties funding operations programs. Federal Government instruction that helps agencies justify M&O costs, such as how to develop, set, and execute performance indicators may ultimately lead to an increase in M&O activity.

3. Train the MPOs on the National Architecture and how to link with the private sector.

A federal objective of greater private sector involvement is needed to ensure that ITS and other systems will continue to operate. Area representatives expressed that professional organizations

are not training or linking the private sector into ITS operations at a fast enough level. Metropolitan areas need private sector involvement to assist with long-term M&O funding.

National Architecture development should begin at the metropolitan level, with direction from the Federal Government, and then expand. The strategy for deploying the National Architecture should include the Federal Government asking: "What would it take to deploy these systems metro-wide, region-wide, statewide, and nation-wide?

4. Push the development of standards and the standards process into the national agenda.

While respondents report that the standards are helpful, the feeling persists that not enough standards are available and that much more is needed. The Federal Government should continue to work with the standards development organizations to ensure that the development of needed standards are a top priority. This may involve providing more resources to expedite the standards process. Respondents concur that the continued development of additional standards will reduce the M&O costs of elements and systems.